

Memorandum

To: Mark Dietrich, Regional Administrator

From: Tom Hepworth, Senior Water Quality Analyst

Date: [REDACTED], 2006

Re: Staff Report for the *Draft* Wastewater-Beneficial Reuse Permit, City of McCammon
LA-000192-01

1. Executive Summary

The purpose of this memorandum is to satisfy requirements in Idaho Department of Environmental Quality Rules, IDAPA 58.01.17, "Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater" for issuing wastewater beneficial reuse permits. It states the principal facts and significant questions considered in preparing the draft permit conditions and provides a summary of the basis for the draft permit. The staff report references applicable requirements and supporting materials as appropriate.

Representatives for the City of McCammon have requested issuance of LA-000192-01, a permit authorizing the city's use of property for beneficial reuse and final treatment of municipal wastewater via land application.

Staff recommends the issuance of LA-000192-01, as attached.

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2. Staff Report

2.1. Background

The City of McCammon is an incorporated community of just over 800 residents in Bannock County, approximately 25 miles south of Pocatello. Since the 1970's, the City has operated a wastewater treatment system using facultative, evaporative lagoons. (Figure 1)

According to a 2002 engineering report compiled by Keller Associates at the request of the City, following spring runoff in some years, the last lagoon cell overflowed to a field north of the lagoon. Once excess effluent spilled, the cell remained at full pool throughout the remainder of the year. (Keller 2002)

The City has responded by retaining Keller to petition the Department for a temporary, emergency permit for wastewater-land application. The Department issued a temporary, emergency wastewater-land application permit on August 30, 2002 that allowed a one-time discharge of treated effluent under controlled conditions. The temporary permit expired October 31, 2002. The City then decided to pursue a permanent land application option to increase final wastewater treatment capacity and prevent future uncontrolled or emergency releases.

Engineering analysis
estimated flows at
approximately 98,610
gallons/day in 2006,

increasing to around 117,250 gallons/day by 2022. Subsequent improvements to the treatment system were accomplished by the construction of additional treatment cells. The two smaller cells (northern-most) were removed from active use after three new cells were constructed and made operational in 2005-2006. (Figure 2)

The components of the current wastewater system include three new cells and the original 13 million gallon storage lagoon. Wastewater flows sequentially through Cells 1 and 2 (aerated), into Cell 3 (not aerated) and finally into the storage cell. Following completion of the wastewater sprinkle irrigation system, effluent will be



Figure 1 City of McCammon Wastewater Facilities



Figure 2 Current Site Configuration

chlorinated at the pump house using liquid hypochlorite injection with a disinfection goal of <23 organisms/100 mL of water.

In March 2006, the City of McCammon acquired property approximately 2600 feet south of the lagoon area to use for sprinkle application of municipal wastewater. The property is 35 acres in size of which 30 acres are useable for land application (5 acres are unsuitable due to steep slopes and proximity to a rail line easement). There are otherwise no features of concern such as public water supplies, or streams that would further reduce the useable acreage within the property acquired by the City.

2.2. Summary of Events

- August 15, 2002 – Meeting between Keller Associates and the Department to discuss a temporary, emergency land application permit to land apply approximately 5.1 million gallons of treated wastewater.
- August 23, 2002 – The Department received an application for a temporary permit.
- August 30, 2002 – The Department issued a temporary permit for emergency wastewater land application.
- May 17, 2005 – The City of McCammon and the Department participated in a preliminary permit application conference.
- May 24, 2005 – Site Visit to proposed sprinkle application area.
- June 6, 2006 – The Department received a formal permit application including a preliminary technical report.
- June 12, 2006 - The Department requested additional application materials.
- June 21, 2006 – The Department received supplemental application materials.
- **August 15, 2006** – The Department issued a completeness determination and draft permit for review and comment.
- **September 30, 2006** – #LA-000192-01 was issued to the City of McCammon

3. Discussion

3.1. Site Soils

Soil management units are contiguous with hydraulic management units and consist of the following soil mapping units as described by the United States Department of Agriculture, National Resources Conservation Service - USDA-NRCS. Table 1 identifies specific types and mapping unit symbols for soils found on soil management units.

Table 1 Mapping Unit Symbols

Map Unit Legend	
Map	Bannock County Area, Idaho
Mapping Unit Symbol (MUSYM)	Description
Arbone silt loam; 1-4 percent slopes	root zone depth is 60 inches or more, well-drained, moderate permeability
Arbone silt loam; 4-12 percent slopes	root zone depth is 60 inches or more, well-drained, moderate permeability

On-site soils are generally well suited for the intended wastewater sprinkle application use. Figure 3 shows the configuration of soil types as determined by NRCS soil mapping unit designations. Approximately 5 acres in the north-east corner of the property are not suitable for irrigated farming due to steep slopes and encroachment on the rail line easement.

3.2. Site Loading and Related Permit Compliance Requirements

3.2.1. Hydraulic Loading -Growing Season



Figure 3 Soil Mapping Units (NRCS-Ssurgo)

In 2006, Keller Associates projected wastewater generation to increase along with population growth, increasing from 35.9 million gallons/year in 2006 to 43.7 million gallons/year by the year 2024.

However, hydraulic loading during the growing season is not expected to exceed, and may not meet crop irrigation water requirements. Alfalfa and/or alfalfa-grass hay mixes are the crops to be used for nutrient removal.

Irrigation Water Required (typical) (inches)			+25% to recover loss from irrigation inefficiency (inches)		Total Irrigation Water Requirement (inches)
33.7			8.4		42.1

Year	Estimated Population	Wastewater to Land Application (gallons) (inches)		Total IWR (inches)	Difference (inches)
2006	860	28,672,960.00	35.2	42.1	(6.9)
2008	880	29,094,120.00	35.7	42.1	(6.4)
2010	900	29,722,350.00	36.5	42.1	(5.6)
2012	920	30,869,187.00	37.9	42.1	(4.2)
2014	940	31,471,200.00	38.6	42.1	(3.5)
2016	960	32,140,800.00	39.5	42.1	(2.7)
2018	980	32,810,400.00	40.3	42.1	(1.8)
2020	1000	34,163,712.00	41.9	42.1	(0.2)
2022	1025	35,383,408.00	43.4	42.1	1.3
2024	1045	36,603,526.00	44.9	42.1	2.8

Figure 4 Irrigation Water Requirements

The crop irrigation water requirement is expected to be in the range of 32-35 inches/year.

Figure 4 is based on the typical crop water requirement for alfalfa (approximately 34 inches - adjusted to 42 inches to recover losses from irrigation inefficiencies) and suggests that the 30 acre land treatment base is adequate at least for the term of this permit cycle (5 years). (A positive number indicates that more wastewater is generated than can be treated on the available 30 acre sprinkle application area. A deficit in the last column indicates inadequate wastewater will be available to meet typical crop irrigation water requirements.) The table suggests that additional treatment capacity will probably be necessary by the year 2022.

According to application materials, supplemental irrigation water is available from an irrigation ditch adjoining the property to the south and the property acquisition includes rights to that water supply. The Permittee is required to add supplemental irrigation water as necessary to preserve crop vitality and productivity. The permit requires the Permittee to estimate crop water requirements at the beginning of each year and to plan wastewater and supplemental irrigation water applications to ensure crop vitality.

3.2.2. Constituent Loading

Based on results from wastewater sampling in 2006, constituent characteristics are consistent with other municipal wastewater sources.

Constituent Concentration (mg/L - average of 2 samples)		
Total-N	COD	Total-P
7.9	12.5	1.35

Figure 5 Constituent Concentrations

Figure 6 summarizes expected constituent loading estimated based on flow (36.6 million gallons annually) and wastewater constituent concentrations provided by the applicant.

Constituent Loading Summary				
	Annual Load			
	Annual Load (lbs)	Annual Average (lbs/ac)		
Nitrogen	2987.1	99.6		
Total P	410.4	13.7		
Sulfate	No	Data		
TDS	No	Data		
NVDS	No	Data		
TDIS	No	Data		
COD Loading Summary				
	Annual Load (lbs)	Annual Average (lbs/ac)	COD Annual Average (lbs/ac-day)	COD Seasonal Loading
				NGS lb/acre NGS lb/ac-d GS lb/acre GS Lb/ac-d
Potassium	424.6	14.2		
Chloride	31842.0	1061.4		
COD	6065.1	202.2	0.6035	0.0 0.0 202.2 0.9435

Figure 6 Estimated constituent loading

Constituent loading at these rates should be inherently protective of ground water (for nitrate contamination) since nitrogen removal is expected to exceed application. Figure 7 summarizes nitrogen removal rates based on data from other wastewater beneficial reuse facilities across southeastern Idaho, including both potato processing and municipal wastewater plants.

Operating Year	Minimum	Maximum	Average of Total N Removed	Hypothetical Permit Limit (1.5 * Average of Total N Removed)
2001-2002	28.4	148.3	71.8	107.7
2002-2003	38.2	191.7	101.0	151.5
2003-2004	9.6	521.9	123.2	184.8
2004-2005	83.1	462.2	160.9	241.3
values in lb/acre-year				

Figure 7 Typical Nitrogen Removal Rates in Southeastern Idaho

The permit establishes a nitrogen loading limit at 150% of typical crop uptake. Based on information in Figure 6, the nitrogen loading permit limit should be around 150 lb/acre-year, given effective site management and normal operating conditions. Assuming wastewater is the sole source of nitrogen applied, the treatment field should operate at a nitrogen deficit for the near future (at least the term of the permit).

Nitrogen loading is considered the land limiting constituent and loading associated with other constituents is not expected to reach levels of environmental concern.

3.2.3. Compliance Requirements

The permit includes two compliance requirements, the implementation of which should enhance the Permittee's regulatory compliance and resource protection efforts.

CA-192-01-1 requires the preparation of the following site management plans to aid facility operators in establishing a repository of information and documentation of materials relative to site operations.

1. Operations and Maintenance Manual
2. Sampling and Analysis Plan
3. Nuisance Odor Management Plan

In accordance with Idaho Department of Environmental Quality Rules, IDAPA 58.01.17, "Rules for the Reclamation and Reuse of Municipal and Industrial Wastewater". (4-11-06), any new proposed reclamation and

reuse facility shall be required to have a detailed plan of operation at the fifty percent (50%) completion point of construction. In addition, after one (1) year of operation the plan must be updated to reflect actual operating procedures. A general outline of the plan of operation was provided with the permit application.

The Sampling & Analysis Plan (SAP) presents an opportunity for the Permittee to compile applicable quality assurance/quality control (QA/QC) provisions. Regulatory intent is that the SAP will be an important resource for system operators to understand the general purpose and range of environmental sampling and monitoring required; the specifics of how environmental samples are to be collected, maintained and processed; and interpretive uses for data obtained.¹

Regarding the requirement for a Nuisance Management Plan, the Permittee should undertake the following actions:

- Identify and understand the potential causes of nuisances, particularly objectionable odors,
- Plan and implement operating practices and or engineering methods to prevent the occurrence of nuisance conditions, and
- Draft a written response plan for responding to nuisance conditions if they occur.

CA-192-02 requires that each lagoon or cell in the wastewater treatment system is to be tested for seepage losses no later than six (6) months prior to permit expiration. This is consistent with Department policy that wastewater storage structures should be evaluated for seepage losses at 5 year intervals. If excessive seepage losses are evident, the Department may require remedial measures including the installation of a dedicated ground water monitoring network and the development of site-specific hydrogeological characterization.

4. Recommendation for Issuance of Permit

Based on the preceding discussion, and following an evaluation of materials submitted by the City of McCammon in application for a wastewater beneficial reuse permit, staff recommends that #LA- 000192-01 is issued as attached.

Attachments: ***Draft Permit for #LA-000192-01***

CC: Rick Huddleston, Wastewater Program Manager, State Office
Tiisetsoe Matseane, Keller Associates

Route file copy to: Mark Dietrich, Regional Administrator

File: Bannock County Municipal Wastewater Land Application, #LA-000192, City of McCammon, Correspondence 2006

4.1. List of References

Keller Associates, 2002. City of McCammon Emergency Wastewater Land Application Permittee.

Keller Associates, 2006, City of McCammon Municipal Wastewater Reuse Permit Applications.

¹ It is not expected or required that the SAP will reproduce sampling and analysis or QA/QC documentation existing in other locations. For example, QA/QC documentation maintained by a laboratory analyzing water or soil samples need not be reproduced in the Permittee's SAP. Likewise, written sampling procedures approved by the Permittee and adhered to by independent contractors would not need to be included in the Permittee's SAP. The Permittee's SAP should incorporate by reference external documentation as appropriate and should be updated as necessary to reflect changes or modifications.

United States Department of Agriculture, National Resources Conservation Services, Soil Survey Geographic Database (Ssurgo), Template Database Version: 32, Idaho version 9, Ssurgo Version: 2.2, Soil Survey Area: ID-711, Bannock County Area, Idaho, Parts of Bannock and Power Counties.

Appendix A. Soils Information

The following are selected reports generated from the SSURGO database for ID-711, Bannock County Area, Idaho, Parts of Bannock and Power Counties.

Map Unit Description (ID)

Bannock County Area, Idaho, Parts Of Bannock And Power Counties

1 - Arbone silt loam, 1 to 4 percent slopes

Mean annual precipitation: 12 to 16 inches
Mean annual temperature: 41 to 45 degrees F

Frost-free period: 75 to 100 days
Farmland class: All areas are prime farmland

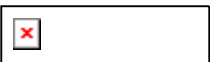
Arbone and similar soils

Extent: about 75 percent of the unit
Landform(s):
Slope gradient: 1 to 4 percent
Parent material: alluvium derived from mixed sources
Restrictive feature(s): none
Seasonal high water table: greater than 60 inches
Flooding frequency: none
Ponding frequency: none

Soil loss tolerance (T factor): 5
Wind erodibility group (WEG): 5
Wind erodibility index (WEI): 56
Land capability subclass, non-irrigated: 3c
Land capability subclass, irrigated: 3e
Drainage class: well drained
Hydric soil class: no
Hydrologic group: B

			Available Water				
Representative soil profile:		Texture	Permeability	Capacity	pH	Kw	Kf
H1 --	0 to 9 in	silt loam	moderate	1.4 to 1.6 in	6.6 to 8.4	.37	.37
H2 --	9 to 60 in	silt loam	moderate	8.1 to 9.1 in	7.4 to 8.4	.43	.49

Ecological Site / Plant Association: LOAMY 13-16 ARTRV/PSSP6 (R013XY001ID)



Map Unit Description (ID)

Bannock County Area, Idaho, Parts Of Bannock And Power Counties

2 - Arbone silt loam, 4 to 12 percent slopes

Mean annual precipitation: 12 to 16 inches
Mean annual temperature: 41 to 45 degrees F

Frost-free period: 75 to 100 days
Farmland class: Not prime farmland

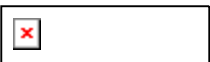
Arbone and similar soils

Extent: about 75 percent of the unit
Landform(s):
Slope gradient: 4 to 12 percent
Parent material: alluvium derived from mixed sources
Restrictive feature(s): none
Seasonal high water table: greater than 60 inches
Flooding frequency: none
Ponding frequency: none

Soil loss tolerance (T factor): 5
Wind erodibility group (WEG): 5
Wind erodibility index (WEI): 56
Land capability subclass, non-irrigated: 3e
Land capability subclass, irrigated: 4e
Drainage class: well drained
Hydric soil class: no
Hydrologic group: B

			Available Water				
Representative soil profile:		Texture	Permeability	Capacity	pH	Kw	Kf
H1 --	0 to 9 in	silt loam	moderate	1.4 to 1.6 in	6.6 to 8.4	.37	.37
H2 --	9 to 60 in	silt loam	moderate	8.1 to 9.1 in	7.4 to 8.4	.43	.49

Ecological Site / Plant Association: LOAMY 13-16 ARTRV/PSSP6 (R013XY001ID)



Map Unit Description (ID)

Bannock County Area, Idaho, Parts Of Bannock And Power Counties

85 - Pits, gravel

Mean annual precipitation:

Mean annual temperature:

Frost-free period:

Farmland class: Not prime farmland

Pits, gravel

Extent: about 100 percent of the unit

Landform(s):

Slope gradient:

Parent material:

Restrictive feature(s): none

Seasonal high water table: greater than 60 inches

Flooding frequency: none

Ponding frequency: none

Soil loss tolerance (T factor):

Wind erodibility group (WEG):

Wind erodibility index (WEI):

Land capability subclass, non-irrigated:

Land capability subclass, irrigated:

Drainage class:

Hydric soil class: no

Hydrologic group: A

<i>Representative soil profile:</i>	<i>Texture</i>	<i>Permeability</i>	<i>Available Water Capacity</i>	<i>pH</i>	<i>Kw</i>	<i>Kf</i>
H1 -- 0 to 60 in	gravel, cobbles	----				

Ecological Site / Plant Association:

This report provides a semi-tabular map unit description with a summary of soil properties and interpretive groups.

